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Looking for Personality in Animals, of All People

By [CARL ZIMMER](#)

A team of Dutch scientists is trying to solve the mystery of personality. Why are some individuals shy while others are bold, for example? What roles do genes and environment play in shaping personalities? And most mysterious of all, how did they evolve?

The scientists are carrying out an ambitious series of experiments to answer these questions. They are studying thousands of individuals, observing how they interact with others, comparing their personalities to their descendants' and analyzing their DNA.

It may come as a surprise that their subjects have feathers. The scientists, based at the Netherlands Institute of Ecology, are investigating personalities of wild birds.

Until recently, most experts in personality would have considered such a study as nothing but foolish anthropomorphism. "It's been looked at with suspicion and contempt," said Dr. Samuel Gosling, a psychologist at the University of Texas.

But scientists have found that in many species, individual animals behave in consistently different ways. They argue that these differences meet the scientific definition of personality.

If they are right, then human personality has deep evolutionary roots. "It's a matter of degree, not of differences," said Dr. Piet Drent of the Netherlands Institute of Ecology.

The bird study that Dr. Drent and his colleagues are conducting is considered the most ambitious investigation of personality in wild animals.

"They've gone the furthest," said Dr. Sasha Dall, an evolutionary biologist at the University of Exeter in Cornwall.

The Dutch researchers are studying the importance of genes to the personalities of the birds, and the effect different personalities have on their survival. They hope next to carry out parallel studies in humans to see whether the same forces behind the evolution of bird personalities are at work in our own species.

The science of human personality is about a century old. Psychologists have relied largely on questionnaires and other testing methods to map out its dimensions. One common method is for scientists to ask their subjects how well certain adjectives apply to themselves (or to people they know well).

"Certain traits tend to go together," Dr. Gosling said. "We find that people who are energetic also tend to be

talkative. It needn't be that way, but that's how it tends to be." The flip side is true as well: less energetic people tend to be less talkative.

Psychologists have found they can bundle these traits into just a few personality dimensions. People may be more or less extroverted, for example, which means they are sociable, assertive and tend to have positive emotions. The same dimensions have been documented across the world, from Zimbabwe to the Russian Arctic, suggesting that they are universal in humans.

Some studies have suggested that genes are responsible for some of the differences in people's personality ratings. But they have been far from conclusive because scientists cannot do experiments with humans. "Human mothers will not let you just swap their infants at birth, which would be a great study to do," Dr. Gosling said.

It has been only in the last decade or so that scientists have investigated whether animals have personalities. In one pioneering study in the mid-1990's, Dr. Gosling studied a colony of 34 hyenas at the University of California, Berkeley. "My goal was simply to say, can we measure personality in animals? It wasn't clear it was going to work," he said.

Dr. Gosling asked the four caretakers of the colony to fill out a modified version of the human questionnaire for each animal.

"It turned out that they agreed at the level you find in humans," Dr. Gosling said. What's more, the hyena personalities fit some of the dimensions found in humans, like neuroticism and agreeableness. Since then, a number of other studies have documented personalities in animals ranging from chimpanzees to squid.

To some biologists, the main question about these animal personalities is why natural selection keeps such a wide range of them. "Why hasn't one personality become the standard in the population?" asked Dr. Drent. If being extroverted offers the best odds for a hyena to reproduce, you might expect that over time, all hyenas would wind up as extroverts.

Dr. Drent and his colleagues hope that their study on birds may reveal some clues. They are studying a European relative of chickadees called the great tit (*Parus major*). Most of the birds spend their entire lives in a single forest, and they are happy to move into comfortable nest boxes provided by the scientists. As a result, the Dutch researchers can track the entire population of birds for years, keeping tabs on their health and their success at reproducing.

The scientists can also bring some of the birds into the lab in order to measure their personalities or carry out breeding experiments.

"These birds are perfect for these sorts of studies," said Dr. Niels Dingemanse of the University of Groningen, a collaborator Dr. Drent.

Instead of questionnaires, the Dutch team tests the behavior of the birds to measure their personalities. In one test, the scientists place a strange object - a penlight battery or a Pink Panther doll - in a bird's cage. Some birds are quick to approach it, while others hang back.

In another experiment, the researchers open a cage door, allowing the birds to explore a large room filled with five artificial trees. Some birds are quick to explore the trees, while others prefer to remain in the comforts of

their cage.

In a third experiment, the researchers place a bowl of tasty mealworms in the room. When the birds land on the bowl to eat, the researchers startle the birds by lifting up a nearby metal plate. They then see how much time passes before the bird returns to the bowl.

The tests revealed that the birds have consistent personalities that remain stable for years. Bold birds, as the scientists call them, are quick to inspect new objects, to explore the trees and to recover from the metal-plate surprise.

Shy birds are slow on all three counts. The differences go well beyond these tests. Bold birds are also more aggressive than shy ones and experience less stress when the scientists handle them.

Breeding experiments revealed that these traits had a strong genetic basis. Over just four generations, the researchers could produce significantly bolder and shyer birds. "About 50 percent of the variation you find in avian personalities is due to differences in genes," said Dr. Kees van Oers of the Max Planck Institute for Ornithology in Germany.

Dr. van Oers is searching for the genes responsible for these differences. He estimates that as many as 10 may play an important role, and he has already pinpointed one strong candidate, known as DRD4.

Some studies on the human version of this gene suggest that it influences how much people seek out new experiences. But other studies have failed to replicate the link. "We're still working on the last bits, but it looks promising," Dr. van Oers said.

The genes for both bold and shy traits have been preserved by natural selection. To find out how this happens, the researchers have observed how birds with different traits have fared over the years. "We were not sure how the data would turn out because no one had collected them before," said Dr. Dingemanse, who led this part of the study.

The researchers found that the personality of birds had a powerful effect on their survival, but that effect changed from year to year as the supply of food fluctuated. "It's quite a complex story," Dr. Dingemanse said. In lean years, for example, bold female birds had a better chance of surviving than shy ones, while shy males did better than bold ones. Those patterns switched during years with abundant food.

Over the course of several years, however, birds with intermediate personalities appear to have had more success at bearing young. "Animals in the middle did better," Dr. Dingemanse said.

If intermediate birds are better adapted than very bold or shy ones, it is strange that all the birds are not intermediate. One possibility is intermediate personalities arise when birds inherit a "bold" version of certain genes from one parent and a "shy" version from the other.

Since a bird has a 50 percent chance of inheriting a gene from its mother or father, it's inevitable that some will wind up with two "shy" genes or two "bold" ones. As a result, they may get extreme personalities.

Another idea the Dutch scientists want to explore is that the social life of birds helps bold and shy personalities to coexist.

Each year the birds fight for territory where they can feed and breed. Bold birds are more aggressive than shy

ones, and that sometimes helps them win territory. But the scientists have found that when bold birds lose, they are slow to recover. They end up at the bottom of the hierarchy, and in many cases just fly away. "They go to other places to try to become No. 1," Dr. Drent said.

This struggle might balance the birds between bold and shy personalities. If there are a lot of shy birds, the few bold ones will rise to the top. But if there are a lot of bold birds, they will fight a lot, and that will result in a lot of bold birds flying away. In these cases, the few shy birds will thrive. "So one of the personalities can never disappear completely," Dr. Drent said.

He and his colleagues plan to test this hypothesis by altering the ratio of bold and shy birds in the wild.

Many of the findings are summarized in the February issue of *Neuroscience and Biobehavioral Reviews*.

Researchers studying animal personality hope that their work will yield some practical benefits. Dr. Gosling and his students, for example, have been focusing much of their research on the personalities of dogs.

An accurate test of dog personality may help animal shelters match pets to families. It may also help identify dogs that are especially well suited to jobs like detecting explosives.

Studies on animal personality may also illuminate human personality. The Dutch researchers are now beginning to compare their research on birds to research carried out on children.

"It was amazing how the way they measured the boldness of the birds resembles tests we have for young children," said Dr. Marcel van Aken, a psychologist at the University of Utrecht. He and the bird researchers plan to measure the personalities of birds and humans with a common set of tests, hoping to find clues to the evolution of human personality.

Barely any research has been carried out on the evolution of human personality, but what little there is suggests that it may have some parallels with what's happened in birds.

In a survey of 545 people, Dr. Daniel Nettle of the University of Newcastle in England found that the more extroverted people were, the more sex partners they tended to have had. That might give them an evolutionary edge, but Dr. Nettle found that they were also more likely to wind up in a hospital.

Dr. Nettle is reporting his findings in a paper to be published in *Evolution and Human Behavior*.

Some experts on human personality remain skeptical. Dr. Daniel Cervone of the University of Illinois at Chicago considers describing animals with terms like extroversion as "extremely risky." The word inevitably means something different when applied to a human or a bird.

"There's a whole load of human qualities that simply weren't going into the ratings in the first place," he said.

Dr. van Aken agrees that anthropomorphism is a real danger, but he thinks it can be avoided. "I'm not so concerned about it," he says. "You have to define clearly what you are going to measure and then let the data speak."